

# BB199

## Variable capacitance diode for VCO and VCXO

Rev. 1 — 1 December 2010

Product data sheet

## 1. Product profile

### 1.1 General description

The BB199 is a low voltage variable capacitance diode for the Voltage Controlled Oscillator (VCO) and Voltage Controlled Crystal Oscillator (VCXO) applications.

#### CAUTION



This device is sensitive to ElectroStatic Discharge (ESD). Therefore care should be taken during transport and handling.

### 1.2 Features and benefits

- Small plastic SMD package
- Very low operating voltage (1 V to 4 V)
- Large capacitance ratio ( $C_{d(0V5)}/C_{d(2V)} = 2.8$  minimum)
- Good capacitor-voltage (C-V) linearity
- Very low series resistance allowing high Q performance.

### 1.3 Applications

- Communication equipment
- Voltage Controlled Oscillators

## 2. Pinning information

Table 1. Pinning

Pin	Description	Simplified outline	Graphic symbol
1	cathode	<a href="#">[1]</a>	
2	anode		 sym008

[1] The marking bar indicates the cathode.

### 3. Ordering information

Table 2. Ordering information

Type number	Package		
	Name	Description	Version
BB199	SC-79	plastic surface-mounted package; 2 leads	SOD523

### 4. Marking

Table 3. Marking codes

Type number	Marking code
BB199	K9

### 5. Limiting values

Table 4. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
$V_R$	reverse voltage		-	20	V
$I_F$	forward current		-	100	mA
$P_{tot}$	total power dissipation	$T_{sp} = 90\text{ °C}$	-	300	mW
$T_{stg}$	storage temperature		-65	+150	°C
$T_j$	junction temperature		-65	+150	°C

### 6. Thermal characteristics

Table 5. Thermal characteristics

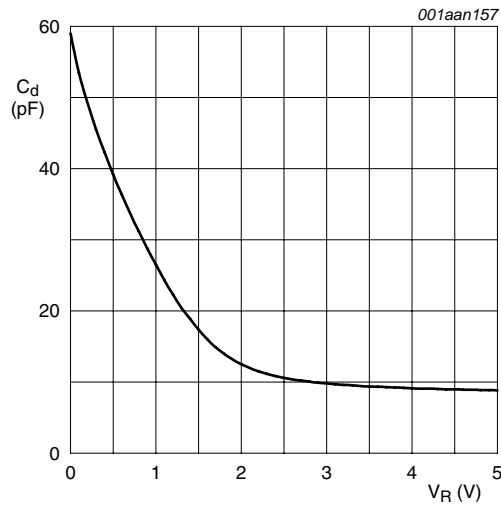
Symbol	Parameter	Conditions	Typ	Unit
$R_{th(j-sp)}$	thermal resistance from junction to solder point		200	K/W

### 7. Characteristics

Table 6. Characteristics

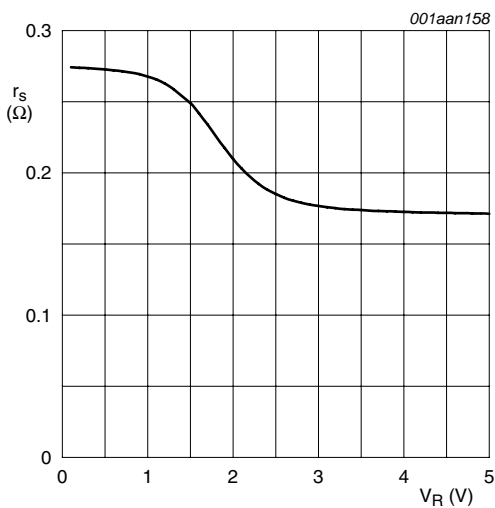
$T_j = 25\text{ °C}$  unless otherwise specified

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_R$	reverse current	$V_R = 20\text{ V}$	-	-	1000	nA
		$V_R = 16\text{ V}$	-	-	5	nA
$C_d$	diode capacitance	$f = 1\text{ MHz}$				
		$V_R = 0.5\text{ V}$	36.5	-	42.5	pF
		$V_R = 2\text{ V}$	11.8	-	13.8	pF
$r_s$	diode series resistance	$V_R = 1.5\text{ V}; f = 100\text{ MHz}$	-	0.25	0.5	$\Omega$
$C_{d(0V5)}/C_{d(2V)}$	diode capacitance ratio (0.5 V to 2 V)	$f = 1\text{ MHz}$	2.8	-	-	



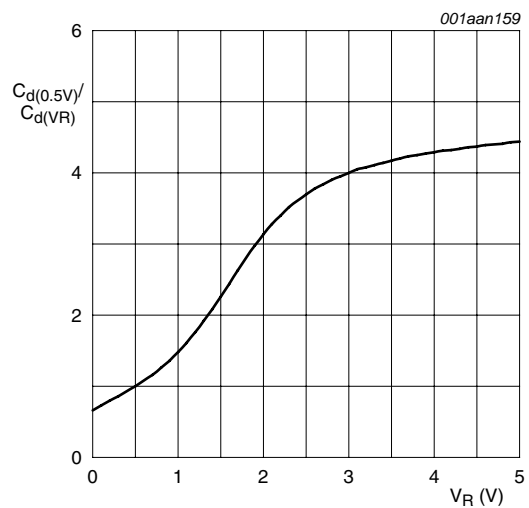
$f = 1 \text{ MHz}; T_j = 25 \text{ }^\circ\text{C}.$

**Fig 1. Diode capacitance as function of reverse voltage; typical values**



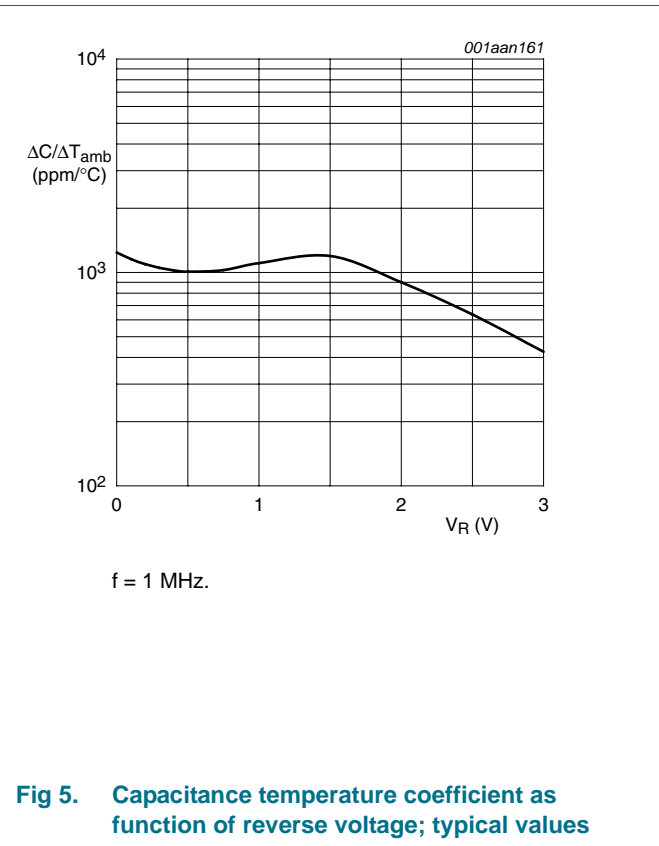
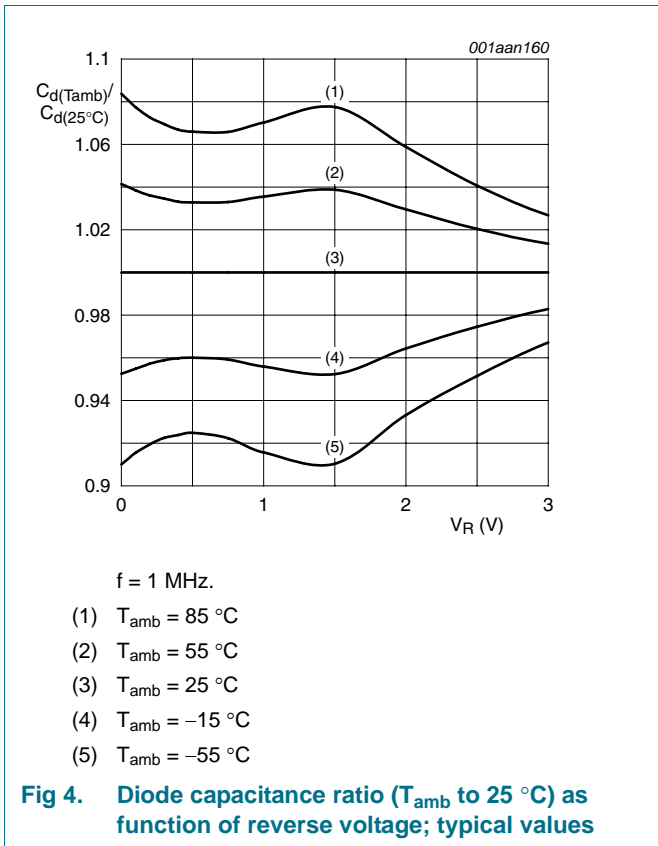
$f = 100 \text{ MHz}; T_j = 25 \text{ }^\circ\text{C}.$

**Fig 2. Diode reverse resistance as function of reverse voltage; typical values**



$f = 1 \text{ MHz}; T_j = 25 \text{ }^\circ\text{C}.$

**Fig 3. Diode capacitance ratio (0.5 V to  $V_R$ ) as function of reverse voltage; typical values**



## 8. Package outline

Plastic surface-mounted package; 2 leads

SOD523

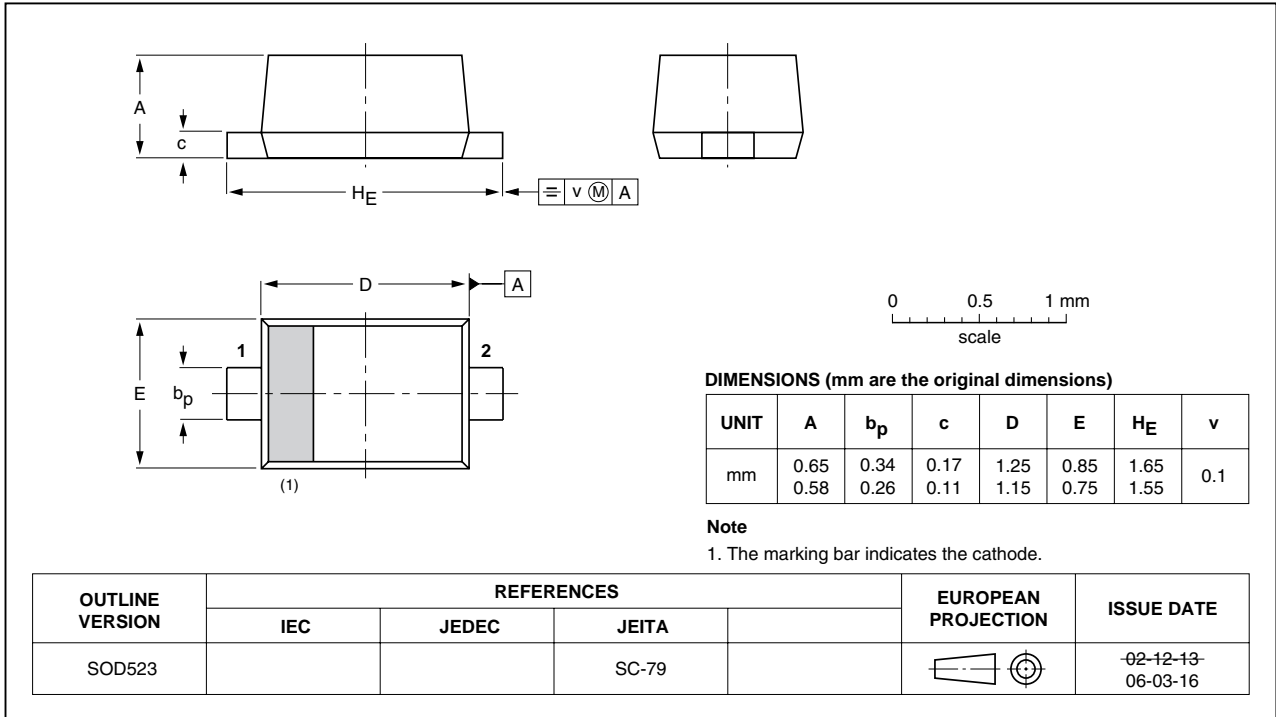


Fig 6. Package outline SOD523 (SC-79)

## 9. Abbreviations

Table 7. Abbreviations

Acronym	Description
Q	Quality factor
SMD	Surface Mounted Device

## 10. Revision history

Table 8. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BB199 v.1	20101201	Product data sheet	-	-

## 11. Legal information

### 11.1 Data sheet status

Document status <sup>[1][2]</sup>	Product status <sup>[3]</sup>	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

[1] Please consult the most recently issued document before initiating or completing a design.

[2] The term 'short data sheet' is explained in section "Definitions".

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